

CASE STUDY

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# Nicolau syndrome with pemphigus vulgaris: a rare case report and review of literature

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## Abstract

**Background** Nicolau syndrome is a rare adverse drug reaction clinically presented with painful erythema and tissue necrosis often accompanied by intramuscular injections of NSAIDs (diclofenac), penicillin, corticosteroids and local anesthetics.

**Case presentation** This case report describes a 29-year-old male patient who was repeatedly hospitalized for the treatment of recalcitrant pemphigus vulgaris. When the patient visited for the fourth time to our hospital, he complained of unusual sharp pain over the right gluteal region ever since the administration of diclofenac 75 mg intramuscular injection for persistent back pain during his previous stay. On physical examination, the right gluteal region showed a globular swelling with erythema and pus filled necrosed tissue. The CT scan did not show any presence of hematoma, ruling out any possibility of compartment syndrome. Based on this clinical evidence he was diagnosed with Nicolau Syndrome secondary to diclofenac injection. The tissue injury necessitated surgical debridement and after a span of 2 months, it healed leaving a permanent scar. In addition, this case report highlights the treatment of recalcitrant pemphigus vulgaris with rituximab therapy.

**Conclusion** Clinical pharmacist plays a vital role in educating healthcare professionals about following right protocol for administration of injectable drugs, early detection and management of the ADR. Similarly, patient receiving injections should be educated about warning signs and symptoms of such adverse drug reaction.

**Keywords** Clinical pharmacist, Diclofenac, Nicolau syndrome, Non-steroidal anti-inflammatory drugs, Pemphigus vulgaris, Rituximab

## Background

Pemphigus vulgaris is a rare non-contagious autoimmune disease, that clinically manifests with blisters and erosion of mucosal or mucocutaneous layer of skin. The worldwide incidence of pemphigus vulgaris is 0.1–0.5 per 100,000 population per year but India has a higher incidence of 4.4 per 100,000 population per year [1]. There

are various types of pemphigus disease but pemphigus vulgaris and pemphigus foliaceus are more frequently encountered. The genetic susceptibility is demonstrated in people with HLA- DRB (human leucocyte antigen DR beta 1), HLA-DQA1 (human leucocyte antigen DQ alpha 1) and DQB1 (human leucocyte antigen DQ beta 1) along with increased frequencies of HLA-DRB1\_0402 and HLA-DRB1\_1404 [2]. Pemphigus has an estimated mortality rate of 60–90%, and if left untreated, the condition can worsen within one to three years [3]. The management of pemphigus mainly consists of treatment with corticosteroids, immunosuppressants and rituximab therapy [3]. Pemphigus patients frequently experience flare-up of symptoms, and one of the major contributing factors is poor compliance to the recommended therapy [4]. Nicolau syndrome is an unusual adverse drug

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reaction alternatively referred as embolia cutis medicamentosa or livedoid dermatitis. The first instance of nicolau syndrome due to bismuth salt was documented in 1924 [5]. Ever since then several theories have been put up, the widely supported hypothesis assumes to have a vascular origin, when an injection is administered it causes direct injury to the small arteries stimulating vasospasm, which further restricts the blood supply and results into necrosis of the surrounding. It initially presents with pain in the injection site, erythema, tenderness, local ischemia followed by necrosis and abscesses formation [6]. These serious complications can result by Intramuscular or intra-articular injections [7]. Although intramuscular injections are commonly used in hospitals, they are not always administered correctly. Most of the time, the drug is delivered into the subcutaneous region rather than muscle, resulting in adverse effects such as edema, granuloma formation, sciatic nerve injury, and tissue necrosis (Nicolau syndrome). [8]. This case report describes the presentation of a life-threatening disease with a rare adverse reaction and highlights the role of pharmacist in various clinical activities.

### Case report

A 29-year-old male patient suddenly developed fluid filled blisters all over the left shoulder 6 months ago and the blisters spread to his right shoulder, back and face in a span of 10 days. He consulted a local doctor and only based on physical examination he was prescribed with oral corticosteroids (prednisolone 20 mg twice a day) and topical medications (Clobetasol propionate 0.05% once a day) for a period of 3 months, but he discontinued the treatment after 1 month as his symptoms had relieved. After few days, he again developed the blisters all over chest, upper and lower limbs and abdomen. He visited our hospital with well-defined hyperpigmented fluid filled lesions and erosions all over his shoulders, chest, back, abdomen and bilateral lower limbs (Fig. 1), which presented a positive marginal nikolsky sign. The Nikolsky sign is a diagnostic indicator which is demonstrated by applying lateral pressure on an intact blister, causing the overlying epidermis to remove and exposing a wet pink skin. This draws an inference of positive Nikolsky sign. Whereas negative sign reveals a dried skin [9]. All Hematological investigations and biochemistry reports were found to be normal. We assessed the severity of the disease using pemphigus disease area index (Table 1).

A skin biopsy was performed and the features confirmed the diagnosis as pemphigus vulgaris. Along with the skin manifestations he presented signs of depression and anxiety with loss of 3kgs in the past 20 days. A psychiatric reference was taken and diagnosed with adjustment disorder secondary to the disease pemphigus



**Fig. 1** Fluid filled blisters in pemphigus vulgaris

vulgaris. For the management of pemphigus patient was treated with dexamethasone azathioprine pulse therapy for 3 days and as steroid sparing agent tablet azathioprine 50 mg was given once a day, to prevent infections in open skin erosions he was prescribed with ceftriaxone intravenous (IV) 1 g twice daily, metronidazole IV 400 mg twice daily and a combination of clobetasol propionate plus gentamycin sulfate topical ointment to be applied over the lesions twice daily, for depression he was prescribed with antidepressants sertraline 50 mg tablet once a day and clonazepam 0.25 mg tablet once a day. The patient stayed in hospital for 5 days and was later discharged with medications: prednisolone 10 mg tablet once daily, doxycycline 100 mg capsule twice daily for 5 days, azathioprine 50 mg tablet once daily, sertraline 50 mg tablet once a day and clonazepam 0.25 mg tablet once a day. Pharmacist counseled the patient about rinsing the oral cavity after administration of prednisolone tablet as it may cause oral candidiasis. Moreover, the pharmacist had also advised the patient to visit the hospital after 2 weeks for follow-up laboratory tests since prednisolone and azathioprine has the propensity to elevate the blood glucose levels and serum creatinine levels, respectively. However, he skipped the follow-up appointment and returned after one and a half month with same complaints but this time the lesions had progressed to the scalp and the lower limbs; fortunately, the laboratory investigations were normal. He was treated for 7 days with Dexamethasone azathioprine pulse 2 therapy, azathioprine 50 mg tablet once daily as maintenance dose, azithromycin 500 mg tablet once a day for 7 days and he was advised to apply the

**Table 1** Pemphigus disease area index scores for 6 follow-ups

Follow-up	Disease activity scores				Disease damage scores			Total score
	Skin	Scalp	Mucous	Total activity score	Skin	Scalp	Total damage score	
1	10	6	2	18	5	1	6	24
2	15	10	6	31	8	1	9	40
3	25	10	15	50	8	1	9	59
4	25	10	15	50	6	1	7	57
5	18	6	4	28	6	0	6	34
6	5	4	0	9	4	0	4	13

The PDAI has a total possible score ranging 0–263, with 250 points representing disease activity (120 points for skin activity, 10 points for scalp activity and 120 points for mucosal activity). 13 points for total disease damage (12 points for skin damage, 1 point for scalp damage). Extent of Pemphigus according to the PDAI total scores: moderate—0–15 points; significant—15–45 points; extensive—> 45 points

topical medication of combination clobetasol propionate and gentamycin sulfate over the scalp. After 14 days he was discharged with azathioprine 50 mg tablet once a day, clonazepam 0.25 mg tablet once a day and sertraline tablet was changed to escitalopram 10 mg tablet once a day which has less adverse effects when compared to sertraline. The patient came for follow-up after one month and this time the lesions had appeared on bilateral buccal mucosa and crusted lesions over scalp. He again underwent Dexamethasone azathioprine pulse 3 therapy and for maintenance of remission, he was prescribed with dexamethasone 100 mg IV once daily, azathioprine 50 mg tablet once a day, ceftriaxone IV 1 g twice daily, metronidazole 400 mg IV twice daily, clonazepam 0.25 mg tablet once a day, escitalopram 10 mg tablet once a day,

for the crusted lesions in the scalp dressings soaked in normal saline with topical cream of clobetasol propionate and gentamycin sulfate were wrapped over the scalp. The pharmacist did not report any major drug interactions, all the drugs were well tolerated by the patient. He was discharged with azathioprine tablet 50 mg once a day, clonazepam 0.25 mg tablet once a day, escitalopram 10 mg tablet once a day, calcium 500 mg tablet once a day and a topical cream of clobetasol propionate and gentamycin sulfate. He visited the outpatient department after 3 weeks with complaints of new blisters all over his body. Upon interviewing we found he had discontinued the medication for 2 weeks and Morisky medication adherence scale was used to evaluate our patient's adherence, and it revealed a score of 4, indicating low adherence

**Table 2** Morisky medication adherence scale

S. No.	Items	Yes	No	Patient's response
1	Do you sometimes forget to take your medications?	0	1	0
2	Thinking over the past 2 weeks, were there any days when you did not take your medications?	0	1	0
3	Have you ever cut back or stopped taking your medications without telling your doctor, because you felt worse when you took it?	0	1	0
4	When your travel or leave home, do you forget to bring along your medications?	0	1	0
5	Did you forget to take your medications yesterday?	1	0	1
6	When you felt your health condition is under control, you stop taking your medications?	0	1	0
7	Taking medications every day is a real inconvenience for some people. Do you ever fee; hassled about sticking to your treatment plan?	0	1	1
8	How often do you have difficulty in remembering to take all medications? Never/Rarely 0 Once in a while 1 Sometime 2 Usually 3 All the time 4			2
Total score				4

Score 4 indicates low adherence [10].

(Table 2) [10]. He was readmitted, laboratory investigations were normal and Dexamethasone azathioprine pulse 4 therapy was initiated and adjuvant maintenance therapy with dexamethasone 100 mg once daily, azathioprine 50 mg tablet once a day and framycetin cream was applied all over scalp twice a day along with povidone iodine 5% w/v solution in 1:2 dilution. On the last day of his hospital stay he complained of back pain for which he was administered diclofenac IM 75 mg on the gluteal muscle. He immediately experienced sharp pain which he neglected and did not inform the hospital staff. He was discharged with azathioprine 50 mg tablet once a day, clonazepam 0.25 mg tablet once a day, escitalopram 10 mg tablet once a day, and a topical cream of clobetasol propionate and gentamycin sulfate. After 10 days he came to the hospital complaining of pain in right gluteal region with erythema and necrosed area of 6 cm × 2 cm (Fig. 2). A CT scan was performed and no hematoma was found. Patient stated a history of IM diclofenac injection administration in right gluteal region. Clinical pharmacist classified the case as a probable adverse drug reaction (ADR) with a score of +5 on the Naranjo ADR probability assessment scale [11], and using ADR Hartwig severity assessment scale the severity of ADR was graded as level 5 [12]. Finally, based on the clinical features it was diagnosed as a rare adverse drug reaction “Nicolau Syndrome” (NS). Clinical pharmacist provided the patient with precautionary yellow card (<https://yellowcard.mhra.gov.uk>) and this adverse drug reaction was reported to



**Fig. 2.** 6 cm × 2 cm necrosed tissue following IM (Intramuscular) diclofenac injection

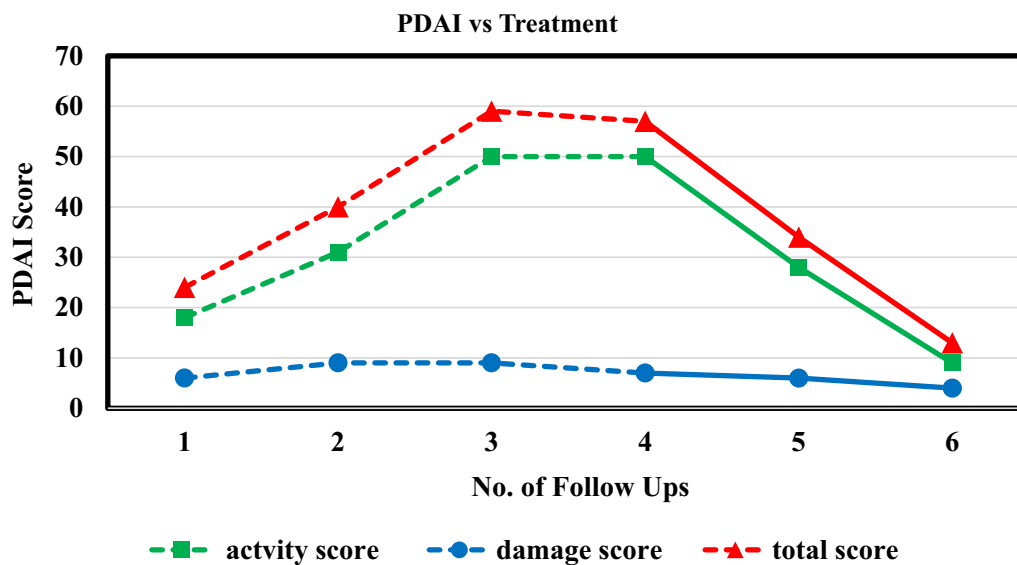
pharmacovigilance program of India (PvPI) ([https://www.ipc.gov.in/PvPI/pv\\_home.html](https://www.ipc.gov.in/PvPI/pv_home.html)).

Patient got operated on the next day to drain the abscess. To prevent wound infection, he was prescribed antibiotics piperacillin and tazobactam 4.5 g IV four times a day, amikacin 500 mg IV twice a day, and injection metronidazole 500 mg thrice a day. Further, a combination of paracetamol 325 mg, serratiopeptidase 15 mg and acefenac 100 mg tablet twice a day was prescribed to combat pain, inflammation and to promote wound healing. A hydrogel ointment of colloidal silver was prescribed for applying on the wound area. The wound healed after 2 months with a permanent scar. The PDAI scores were assessed during all follow-ups, initially the lesions predominantly involved only chest and scalp (follow-up 1 and 2), but due to lack of compliance to the therapy, the lesions progressed to thighs, face, oral mucous and buttocks. (Table 1 and Fig. 3). He got readmitted for the treatment of pemphigus vulgaris with rituximab therapy. Although, he was reluctant due to high cost of rituximab but eventually agreed when a proper explanation about the efficacy of the drug was given by the pharmacist. He was administered with slow IV infusion of rituximab 1 g in 400 ml normal saline. Patient was observed for 24 h for any adverse effects and rituximab therapy was well tolerated. He was discharged with prednisolone 10 mg tablet once daily, doxycycline 100 mg capsule twice daily for 5 days, and escitalopram 10 mg tablet once a day. Since, the patient was administered with rituximab therapy, he is more prone to opportunistic infections. Further, clinical pharmacist counseled the patient regarding side effects of doxycycline i.e., hypersensitivity reactions and escitalopram such as insomnia, flu like symptoms, constipation etc. The patient was called to remind a follow-up for 2nd dose rituximab therapy after 10 days. After administration of the 2nd dose of rituximab the lesions had subsided, leaving only dried crusts. The extent of pemphigus lesions had reduced after the treatment with rituximab. Figure 3 depicts reduction of pemphigus severity following the administration of rituximab therapy as solid lines, and Table 1 depicts the PDAI scores for follow-up 5 and 6.

## Discussion

Pemphigus vulgaris is a rare acantholytic vesiculobullous disease of autoimmune origin that primarily affects people aged between 45 and 65 years [13]. An unknown stimuli of the immune system triggers B lymphocytes to produce IgG antibodies, that binds with desmoglein protein and initiates apoptosis [14]. All the dead cells subsequently release protease enzymes, further breaking down desmoglein protein. Destruction of desmoglein protein results in acantholysis (loss of cell–cell





**Fig. 3** Dotted lines represent DAP (Dexamethasone Azathioprine Pulse) therapy and Solid lines represent rituximab therapy

adhesion). This causes eruption of blisters and erosions, often originating from oral cavity and spreading all over the body [15]. Various scoring systems are used to assess the severity of blistering disease and treatment response. We used pemphigus disease area index (PDAI) scoring system which is summarized in Table 1 and Fig. 3. The PDAI scale includes a total score of 263 points, with 250 reflecting disease activity, out of which 120 represents skin activity, 10 points for scalp activity, and 120 representing mucosal activity. The remaining scores, 12 and 1 reflect the skin and scalp damage scores, respectively. Pemphigus is classified as mild (0–15 points), substantial (15–45 points), or extensive (>45 points) [16]. Management of pemphigus requires treatment with corticosteroids pulse therapy, and immunosuppressants. Pulse therapy involves administration of high dose corticosteroids through intravenous infusion given in 4 phases [17]. The available pulse therapies are dexamethasone cyclophosphamide pulse (DCP), Dexamethasone Azathioprine Pulse (DAP), Dexamethasone Methotrexate Pulse (DMP). But, when these are administered for a long time, patient tend to get resistant or acquire various adverse effects, making it difficult to control the disease [17]. Alternative treatment option like rituximab is very effective in controlling and preventing reoccurrence of the lesions. Rituximab is a monoclonal antibody, that directly attacks B lymphocytes by binding with CD20 protein, reduction in B cells results in suppression of IgG antibody production [18]. Similarly, our patient initially received Dexamethasone azathioprine pulse therapy for 4 months, but no improvement was seen and finally he

was informed about rituximab therapy. The lesions subsided after administering two doses of rituximab leaving only dried crusts. Figure 3 depicts the severity of pemphigus disease and treatment with corticosteroid therapy and rituximab therapy during six months follow-up. Despite having a good efficacy profile, the high cost and little knowledge about long term side effects such as severe infections due to neutropenia makes rituximab an unpopular choice of treatment [19]. However, poor adherence to the recommended regimen is a significant contributor to disease recurrence. Additionally, non-compliance increases the duration of the treatment and also makes achieving remission a challenging task [20]. We used the Morisky medication adherence scale to assess the patient’s adherence to therapy (Table 2. scoring 4, low adherence). Originally consisting of four questions (MMAS-4), it was later upgraded with eight questions (MMAS-8), which is effective for understanding medicine taking behavior [10]. Further, the NS was diagnosed as adverse drug reaction based on Naranjo ADR assessment scale it (probable, score +5) and a severity level 5 using ADR Hartwig severity assessment scale. Naranjo algorithm consists of 10 questions that are answered as either Yes, No, or “Do not know”. Different point values (–1, 0, +1 or +2) are assigned to each answer and is useful in assessment of causality for all adverse drug reactions [11]. Another instrument that was used to assess the severity of ADR is the Hartwig’s severity scale. The severity of ADRs is categorized into mild (level 1–2), moderate (level 3–4) and severe (level 5, 6 and, 7) [12]. Further, Table 3 summarizes clinical findings of

**Table 3** Summary of clinical characteristics and management of diclofenac induced nicolau syndrome

References	Age / gender	Clinical features	Onset of reaction post injection	Culture report	Patient history	Treatment	Recovery time
Murrell et al. [16]	58/Male	10×7 cm Necrotic patch	Pain (Immediately) Necrosis (14th day)	<i>Pseudomonas aeruginosa</i>	Gouty attack on right knee	Surgical debridement, Antibiotics (IV piperacillin), Oral analgesics	2 months
Ratnawidya et al. [20]	69/Female	Necrosis and echar formation	Pain (Immediately) Necrosis (10th day)	–	B/L total knee arthroplasty	Surgical debridement, Skin graft	2 months
Lie et al. [21]	45/Female	15×20 cm necrotic patch	Severe Pain (Immediately) Necrosis (2nd day)	–	Headache	Surgical debridement, Antibiotics (IV ampicillin), surgical dressing	3 months
Okan and Canter [22]	34/Female	Necrotic patch	Pain (2 h) Necrosis (2nd day)	–	Headache	Antibiotics Skin graft	3 months
Arslan et al. [7]	40/Female	Sepsis of necrosed tissue and death	necrosis (3rd day) death (5th day)	<i>Streptococcus pneumoniae</i>	Otitis media chronic kidney disease	Fasciotomy, Enoxaparin Antibiotic (ceftriaxone, linezolid, clindamycin)	Death
Şenel et al. [23]	60/Female	Erythematous patch	Skin discoloration (12th day)	–	Knee osteoarthritis	Ayurvedic treatment	1 month
El Tal et al. [18]	60/Female	Crusted plaque with skin necrosis	Plaque formation (6th day)	–	Lumbar pain	Surgical debridement, skin graft Mupirocin ointment	3 months
Mustafi et al. [17]	30/Male	8×6 cm crusted necrotic plaque	Necrotic plaque (7th day)	–	Post operative pilonidal sinus excision	Surgical debridement, skin graft, Mupirocin ointment	3 months
Chan et al. [24]	60/Male	Purpuric patch with progression to opposite buttock	Progression of discoloration (4th day)	–	Headache	Extensive surgical debridement, Skin graft	8 months
Sasmal et al. [29]	26/Male	Erythema and plaque formation	Plaque formation (4th day)	–	Ankle sprain	Surgical debridement, antibiotics	2 months
Park et al. [27]	20/Male	Erythematous rash with bleeding	Pain with bleeding (immediately)	–	Pain in legs	Oral prednisolone, IV analgesic, antibiotic (IV amoxicillin)	6 months
Rygnestad and Kvam [30]	42/Female	6×9 cm plaque and ulcer formation	Plaque and ulcer formation (10th day)	–	Migraine	Sterile dressings, antibiotics	1 month
Kim [25]	60/Female	Death due to septic infection	Streptococcal myositis infection and death (2nd day)	<i>Streptococcal spp</i>	Streptococcal myositis	Surgical debridement	Death
Kiliç et al. [26]	61/Female	Erythema, necrosis and bulla formation	Necrosis and bulla formation (2nd day)	<i>Escherichia coli</i>	Renal colic	Surgical debridement, antibiotics (penicillin, gentamycin, clindamycin)	2 months

diclofenac induced Nicolau syndrome case reports obtained from PUBMED and google scholar. NS is a rare and fatal adverse effect caused widely used non-steroidal anti-inflammatory drugs (diclofenac, ketoprofen, ibuprofen, piroxicam, phenylbutazone, ketorolac), penicillin derivatives, antihistamines, vaccines, corticosteroids, glatiramer acetate, local anesthetics and sometimes reported with bismuth salts, interferon- $\alpha$  [21, 22]. NSAIDs like diclofenac can inhibit cyclooxygenase enzyme and suppress prostaglandin synthesis resulting into vasospasm. Moreover, application of cold compress can aggravate the damage [23] and similarly our patient had applied cool pack, which might have aggravated the vasospasm effect. A study conducted by Chan et al. [24] revealed the majority of injections intended for intramuscular injections were actually administered in subcutaneous fat layer. In Table 3 we have summarized the clinical aspects of diclofenac induced nicolau syndrome. Majority of the cases were females; this might be due to excess fat deposited in the gluteal region [25–27]. In all the cases, we observed that patients experienced intense pain, with erythema and skin discoloration within two to four days, which subsequently progressed to plaque formation and necrosis of the tissue [27]. Diclofenac was used for headache, pain associated with bone related disorders (gout, arthroplasty, osteoarthritis), [21, 25, 28] post operative pain management and the predominant site of administered was either right or left buttock, perhaps in few cases, necrosis had spread to the other side as well [29]. The abscess and damaged area were infected with *Pseudomonas aeruginosa*, *Streptococcus pneumoniae* and *Escherichia coli* [7, 21, 30, 31]. Whereas in this case the culture sensitivity test was negative. There is no definite tool to identify nicolau syndrome and is often misdiagnosed as acute compartment syndrome, the clinical features are similar in both, except the presence of hematoma or occlusion in artery and involvement of femoral artery makes the differential diagnosis [25, 32]. A CT scan or MRI can also be used to rule of presence of hematoma. A CT scan was performed in our patient and no hematoma was found [31, 33]. The damaged area can be treated by surgical debridement, skin grafting, routine sterile dressings and antibiotics for prophylaxis of any secondary infection. Usually, the prognosis of the adverse reaction depends upon severity and affected area. The recovery period can vary from 1 to 8 months or may even result in death [7, 30, 34, 35]. There are a number of standard operating procedures (SOP) to be followed while administering intramuscular injection. Firstly, the needle used for intramuscular route of administration should be carefully selected based on individual's

physical structure, it is mostly not preferred in obese patient [36]. Usually, a 45 kg patient requires 1.45 inches needle whereas a 90 kg individual may require 2 inches needle [21]. Second, the Z-track method of intramuscular administration should be followed by slightly pulling the skin to leave a zigzag route to minimize the irritation and prevent leakage of the medication to subcutaneous tissue [21, 25]. Third, when a patient requires multiple or large volume of drug administration, same site should be avoided [37]. Although, reoccurrence is unusual in nicolau syndrome, still patient should be provided with precautionary yellow card [38]. Serious adverse reaction can prolong the hospital stay, adding needless healthcare costs and increasing the patient's financial burden. Several studies have suggested that pharmacist participation has reduced medication errors, adverse drug events, hospital readmission and have had a positive impact on treatment related outcomes [39]. In the present case clinical pharmacist played prominent roles like determining the appropriateness of medications prescribed, identifying drug interactions, detection of adverse drug reactions, patient counseling and telephonic follow-up reminders. Moreover, NSAIDs are frequently used in healthcare centers and relative serious adverse reaction can be avoided. Clinical pharmacist can take part in educating the health care workers and patients [38, 39], as well as monitor that proper technique for administration of injections is being followed to prevent future instances.

## Conclusion

Nicolau syndrome is unpredictable and is caused by commonly used parenteral form of NSAIDs, local anesthetics, penicillin, corticosteroids. However, clinical pharmacist can conduct awareness program about following right protocol for administration of injectable drugs, early detection and management of adverse drug reactions among health care workers. Similarly, clinical pharmacist can provide patient education about warning signs and symptoms of such adverse drug reaction. This will minimize the hospital re-admission; length of hospital stays and additional health care cost.

## Abbreviations

ADR	Adverse drug reaction
CT	Computed tomography
HLA	Human leucocyte antigen
HLA-DRB	Human leucocyte antigen DR beta 1
HLA-DQA1	Human leucocyte antigen DQ alpha 1
HLA-DQB1	Human leucocyte antigen DQ beta 1
IM	Intramuscular
IV	Intravenous
DAP	Dexamethasone azathioprine pulse therapy

MMAS-4	Morisky medication adherence scale 4
MMAS-8	Morisky medication adherence scale 8
MRI	Magnetic resonance imaging
NSAID	Non-steroidal anti-inflammatory drugs
NS	Nicolau syndrome
PV	Pemphigus vulgaris
SOP	Standard operating procedure

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### Author contributions

DA collected and assessed the case. DA wrote the final manuscript. S revised and edited the final version of manuscript. SW and BD supervised and approved the final version of manuscript. SW holds the responsibility of the final draft.

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### Ethics approval and consent to participate

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### Competing interests

The authors declare that they have no competing interests.

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